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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/676,295	09/30/2003	Andrea Urban	10191/3212A	8189
26646	7590	08/21/2006	EXAMINER	
KENYON & KENYON LLP			AHMED, SHAMIM	
ONE BROADWAY			ART UNIT	
NEW YORK, NY 10004			PAPER NUMBER	

1765

DATE MAILED: 08/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/676,295

**Applicant(s)**

URBAN ET AL.

**Examiner**

Shamim Ahmed

**Art Unit**

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 10-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments with respect to claims 1-8,10-21 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-3,11-15 and 18-21 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Regarding claim 1, the phrase "if an at least approximately ambipolar plasma is present" renders the claim indefinite because it lacks proper process steps for etching the structure. It is also not clear what happened if the ambipolar plasma is not present in a pulse or modulated-type plasma generation?

5. Regarding claim 11, the phrase "at least at one time at which an at least approximately ambipolar plasma is present" renders the claim indefinite because it lacks proper process steps for etching the structure.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-3 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grunwald (4,863,549) in view of O'Neill et al (5,683,538).

Grunwald teaches a plasma etching process for etching a silicon body with photoresist masking layer including the step of generating the plasma, which inherently includes at least approximately ambipolar plasma by injecting high frequency power into the substrate via the substrate electrode (6), wherein the plasma is modulated or pulsed as a function of time (abstract and col.2, lines 43-col.3, lines 1-39).

Grunwald fails to teach the plasma is modulated.

However, O'Neill et al teach an etching process using plasma, wherein the plasma is modulated or pulsed at a frequency of 500 Hz (col.6, lines 56-65) for desired improved etch selectivity.

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine O'Neill et al's teaching into Grunwald's process for an improved etching selectivity as taught by O'Neill et al.

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9. Claims 4-6,10-15 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grunwald (4,863,549) in view of O'Neill et al (5,683,538) and further in view of Koshimizu (5,290,383).

Modified Grunwald discusses above in the paragraph 8 but fail to teach adding an inert gas in the plasma.

However, in a controlled plasma etching process of silicon substrate, Koshimizu teaches the addition of inert gas into the plasma in order to stabilize the plasma (col.14, lines 29-41).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Koshimizu's teaching into modified Grunwald's process for stabilizing the plasma as taught by Koshimizu.

As to claim 10, it would have been obvious to pause the plasma pulse during the pause of the substrate pulse.

10. Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grunwald (4,863,549) in view of O'Neill et al (5,683,538) and further in view of Hashimoto et al (5,779,925).

Modified Grunwald discusses above in the paragraph 8 but fail to teach synchronizing the modulation and the low-frequency modulation with one another.

However, Hashimoto et al teach that the RF bias is synchronized with the on/off modulation in order to reduce charging damage with out lowering the through put (col.16, lines 35-42, lines 66-col.17, line 5).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Hashimoto et al's teaching into modified Grunwald's process for reducing charging damage and for improved etching precision as taught by Hashimoto et al.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grunwald (4,863,549) in view of O'Neill et al (5,683,538) and further in view of Dockrey (4,799,991).

Modified Grunwald discusses above in the paragraph 8 and also teach that the under etching can be performed using  $\text{SF}_6$  (col.2, lines 64-65) but fail to teach that the under etching is performed using highly oxidizing fluorine compound includes  $\text{ClF}_3$ .

However, in a process of silicon etching, Dockrey teaches both the  $\text{SF}_6$  and  $\text{ClF}_3$  can be used as an efficient etchant for silicon (see claims 7 and 12).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to combine Dockrey's teaching into modified Grunwald's process because both  $\text{SF}_6$  and  $\text{ClF}_3$  are functionally equivalent as taught by Dockrey.

### ***Conclusion***

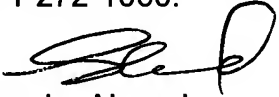
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Shamim Ahmed  
Primary Examiner  
Art Unit 1765

SA  
August 17, 2006